NYS STEM Quality Learning Rubric

Prologue

There is broad agreement that STEM education can prepare a qualified workforce necessary to support economic growth. The New York State Board of Regents made significant decisions in January 2015 that recognize the need for STEM education in the Science Strategic Plan process and in establishing alternate diploma pathway options. In addition, the $28 million, seven-year plan to fund P-Tech projects in technology, manufacturing, healthcare and finance is expected to provide thousands of students with coordinated high school and college career preparation in STEM fields aligned with business and employer needs. In addition to support from the Board of Regents, NYS Legislature and Governor Cuomo, the P-Tech projects enjoy support from SUNY and the New York State Business Council, among others.

Even though many PreK through graduate school Science, Technology, Engineering, and Math (STEM) initiatives are being delivered throughout the education continuum across New York State and the United States, much of what has been achieved, thus far, can be found in various unique forms within isolated pockets. When it comes to STEM Education, our State and nation are still in their infancy. STEM education and integrated learning are critical for the development of innovative and effective problem solvers for the 21st Century and beyond. Well coordinated efforts need to be initiated in order to ultimately bring about compelling and powerful STEM learning to every community, school and student.

New York State is in need of a STEM Quality Learning Rubric that is adaptable and flexible for K-12 and higher education levels. The rubric can serve as a holistic guide. It is not intended for assessment purposes but, rather, as a tool for the implementation and transitional building and strengthening of new STEM focused programs. It can also serve to strengthen, with greater clarity, the approach and delivery of existing STEM focused schools and programs. Additionally, this rubric can also support comprehensive schools that desire to incorporate more breadth and depth with STEM related instruction. The essential goal is to achieve a systemic approach to continuous improvement and evolution with integrated STEM delivery throughout K-12 and higher education.

This rubric was developed by a statewide team of STEM leaders from the NYS STEM Collaborative and the Empire State STEM Learning Network. It is being proposed for endorsement by statewide STEM-related organizations and education leaders during the fall of 2015.

NYS STEM Quality Learning Rubric

Not Evident	Emerging	Engaged	Accomplished
#1 Degree of STEM Integration			
No opportunities for students to consider relationships between STEM disciplines,	Students complete tasks that integrate knowledge/skills from two of the STEM disciplines.	Students complete tasks that integrate knowledge/skills from three of the STEM disciplines.	Students complete self-directed tasks that integrate knowledge/skills from all four STEM disciplines and solve an authentic problem.
#2 Connections to Non-STEM Disciplines			
No opportunities for students to make connections between their STEM learning and other disciplines (ie. The arts, Language Arts, Social Studies).	Students are encouraged to make connections between STEM and non-STEM disciplines but are not performing tasks that integrate those disciplines.	Students complete tasks that integrate knowledge/skills from STEM to at least one non-STEM discipline.	Students complete self-directed tasks that integrate knowledge/skills from STEM to multiple non-STEM disciplines including instructional support for quality performance in the non-STEM disciplines. The tasks solve an authentic problem.
#3 Degree of Use of Project-Based Learning (PBL)			
No opportunities for students to be engaged in PBL in STEM disciplines.	Students are engaged in PBL at least monthly in all STEM disciplines.	Students are engaged in PBL at least monthly in all STEM disciplines and at least one non-STEM discipline.	Students regularly complete self-directed, authentic PBL experiences in all STEM disciplines and multiple non-STEM disciplines.
#4 Connections to STEM Careers			
No opportunities for students to explore STEM careers relating to STEM learning experiences.	Students explore careers in some STEM fields but there is no connection with STEM learning experiences.	Students explore one or more STEM careers and are engaged in activities that connect STEM learning experiences to careers.	Students complete tasks in a simulated or real STEM work environment of their choosing and explore multiple STEM careers that directly connect to their STEM learning environment. Tasks include: describing the work/workplace, noting observations in a journal, describing the educational and skill requirements and reflections on the career/career experience.

#5 Individual Accountability in Collaborative Work

No opportunities for students to work or learn in collaboration with other students.	Students are encouraged to work in teams but the work is informal with no attention to individual accountability.	Students are required to work in formally structured teams with specific methods to measure individual and team accountability.	Students are required to work in formally structured teams with clear evaluation of expectations for team and individual accountability including instruction on interpersonal skills valued in the real-world work setting. Students contribute to the development of accountability rubrics.

#6 Application of the Engineering Design Process

No opportunities for students to apply the engineering design process.	Students are encouraged to refine higher order cognitive skills but with no direct connection to an engineering design process.	Students are required to demonstrate higher order cognitive skills in at least half of the steps in the engineering design process in suggesting an improvement to an everyday item.	Students are required to demonstrate higher order thinking skills in the engineering design process while using the full complement of design steps, well as iterative thinking. Students demonstrate the process of an everyday technology of their choosing and ideas that could improve the technological device or item.

#7 Assessment of STEM Learning

Student learning is assessed infrequently and with traditional measures (quizzes, multiple choice tests).	Student learning is assessed periodically with at least one performance-based assessment task.	Student learning is regularly assessed with at least one performance-based task tied to a well-developed rubric.	Student learning is regularly assessed with multiple indicators of success including more than one authentic, performance-based task, presentations and portfolio entries tied to well-developed rubrics requiring students to apply real-world knowledge/skills.

#8 Connections to STEM Partners

No opportunities for students to benefit from STEM partnerships with other schools, community resources, professional organizations, higher ed or businesses.	Students are engaged in a STEM experience resulting from a STEM partnership.	Students are engaged in multiple STEM experiences resulting from two or more STEM partnerships.	Students regularly complete self-directed, authentic STEM experiences resulting from well-developed partnerships that are purposeful, monitored and evaluated.

#9 Degree of Technology Integration

No opportunities or resources for students to use technology to support scientific practices and cognitive skills. Technology is used as a demonstration tool in a teacher-centered environment.	Students are provided limited resources to support technology integration and are occasionally required to use technology to support scientific practices and cognitive skills.	Students are provided sufficient resources to support technology integration and are frequently required to use technology to support scientific practices and cognitive skills. Teachers are provided sufficient technology training and support.	Students are provided high quality resources and teachers have access to high quality training to support technology integration. Students regularly use technology to support scientific practices and cognitive skills and apply these transferable skills to solve real world problems in a student-centered environment.